Draft

Space Imaging EOSAT

Support Data Extensions (SDE)

for the

National Imagery Transmission Format

of the

National Imagery Transmission Format Standards

Version 5.0
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1. DETAILED REQUIREMENTS

1.1 Generic Tagged Extension Mechanism The tagged record extensions defined in this document are "controlled tagged record extensions" as defined in Section 5.9 of the NITF 2.0 document. The tagged record extension format is summarized here for ease of reference. Tables 1.1-1 and 1.1-2 describe the general format of a controlled tagged record extension. NOTE: All blanks or spaces in this document are defined as ASCII spaces (i.e. hex '20') and are used interchangeably.

Table 1.1-1 Controlled tagged record extension format.

(R) = required, (O) = optional, and (C) = conditional

FIELD	NAME	SIZE	VALUE RANGE	TYPE
CETAG	Unique extension type identifier	6	Alphanumeric	R
CEL	Length of CEDATA field	5	00001 to 99999	R
CEDATA	User-defined data	*	User-defined	R

* equal to value of CEL field.

All fields of all of the tags defined within this document are of type "Required".

Table 1.1-2 . Controlled tagged record extension field descriptions.

FIELD	VALUE DEFINITIONS AND CONSTRAINTS
CETAG	This field shall contain a valid alphanumeric identifier properly registered with the NTB.
CEL	This field shall contain the length in bytes of the data contained in CEDATA. The tagged record's length is 11+ the value of CEL.
CEDATA	This field shall contain data of either binary or character data types defined by and formatted according to user specification. The length of this field shall not cause any other NITF field length limits to be exceeded but is otherwise fully user-defined.

The CETAG and CEL fields essentially form a small (11 byte) tagged record subheader. The format and meaning of the data within the CEDATA field is the subject of this document for several, individual controlled tagged record extensions.

Multiple tagged extensions can exist within the tagged record extension area. There are several such areas, each of which can contain up to 99,999 bytes worth of tagged extensions. There is also an overflow mechanism, should the sum of all tags in an area exceed 99,999 bytes. The overflow mechanism allows for up to 1 Gbyte of tags. Figure 1.1-1 shows a diagram of the tagged extension locations within the NITF 2.0 file structure.

While the extensions defined in this document will typically be found in the **image sub-header**, it is possible that they could appear in a Data Extension Segment which is being used as an overflow of the image sub-header.

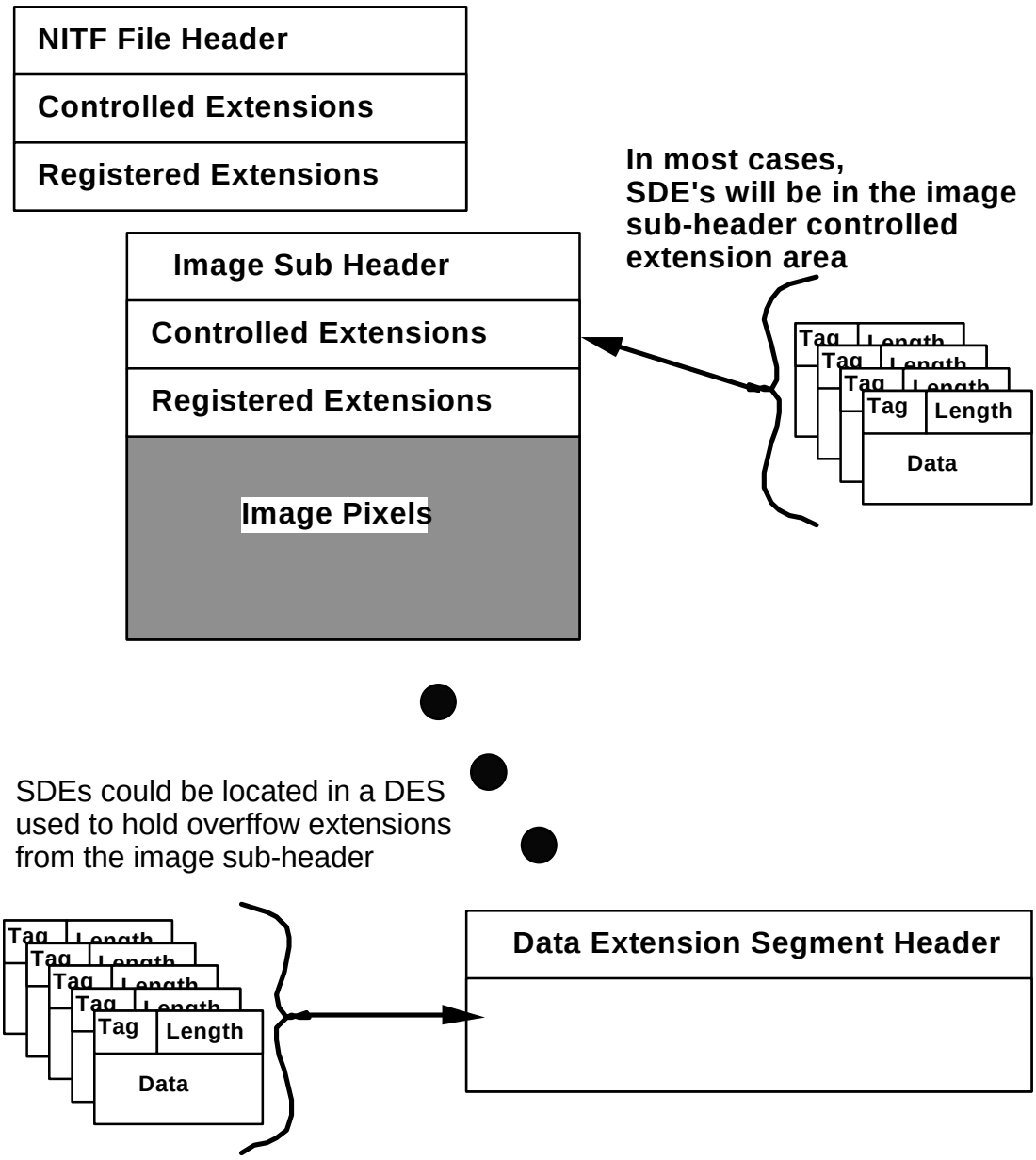

Figure 1.1-1. ***Support Data Extensions (SDEs) may be located in these areas.***

If the information contained within an extension is not available, the extension will not be present in the file. For example, many images may not contain an STREOB. If the intended use of a file does not require the information contained in an extension, it is not required to be present. The set of extensions stored within the file can change over the lifetime of the image. For example, the RPC00A tag may be added to the file at some time after the NITF 2.0 file is initially created, or additional STREOB extensions could be added as stereo mates are identified. When an extension is present, all of the information listed as Required must be filled in.

2.1 STDIDC (TBR) — Standard ID

The STDIDC (TBR) is used for storage and retrieval from standard imagery libraries, and is a required component of all imagery files. The format and description for the user defined fields of the STDIDC (TBR) extension are detailed in Table 2.1-1 A single STDID is placed in the Image Subheader; where several images relate to a single scene, an STDIDC (TBR) may be placed in each applicable Image Subheader.

Table 2.1-1. STDIDC (TBR) — Standard ID Extension Format
(TYPE "R" = Required, "C" = Conditional)

FIELD	NAME	SIZE	VALUE RANGE	UNITS	TYPE
CETAG	Unique Extension Identifier	6	STDIDC (TBR)	n/a	R
CEL	Length of Data Field	5	00083	Bytes	R
The following fields define STDIDC (TBR)					
MISSION_DATE	Mission Date. This field shall contain the date of the collection mission (date of aircraft takeoff) in the format YYYYMMDD, in which YYYY is the year, MM is the month (01–12), and DD is the day of the month (00-31). The date changes at midnight GMT.	8	YYYYMMDD		R
MISSION	Mission Identification. Fourteen character descriptor of the vehicle. For satellite, identifies the specific vehicle as source of image data. For aerial, identifies the scanner.	14 (TBR)	Alphanumeric		R
PASS	Pass Number. Each pass or flight per day shall be identified by a number in the range 01 to 20. In order to ensure uniqueness in the image id, if the satellite or aerial mission extends across midnight GMT, the pass number shall be 0x (where x is in the range 0 to 9) on images acquired before midnight GMT and Ax on images acquired after midnight GMT; for extended missions Bx, … Zx shall designate images acquired on subsequent days.	2	Alphanumeric 01 to 20, A1 to A9 B1 to B9 … Z1 to Z9		R
OP_NUM	Image Operation Number. Imaging operations numbers shall increase with each Imaging System pass.	3	001 to 999		R
START_SEGMENT	Start Segment ID	2	AA to ZZ		R
REPRO_NUM	Reprocess Number. This field indicates whether the data was reprocessed to overcome initial processing failures, or has been enhanced. A "00" in this field indicates that the data is an originally processed image.	2	00 to 99		R

FIELD	NAME	SIZE	VALUE RANGE	UNITS	TYPE
REPLAY_REGEN	Replay (remapping) imagery mode shall provide the capability to alter the digital processing of previously recorded digital imagery. Regen regeneration imagery mode provides the capability to produce an image identical to the image that was produced in initial process. The images are used as replacements for images damaged during production A "000" in this field indicates that the data is an originally processed image.	3	Alphanumeric		R
BLANK_FILL	Blank Fill	1	blank or _		R
START_COLUMN	Starting Column Block (along scan direction).	3	001 to 999		R
START_ROW	Starting Row Block (cross scan direction).	5	00001 to 99999		R
END_SEGMENT	Ending Segment ID of this file	2	AA to ZZ		R
END_COLUMN	Ending Column Block (along scan direction).	3	001 to 999		R
END_ROW	Ending Row Block (cross scan direction).	5	00001 to 99999		R
COUNTRY	Country Code. Two letter code defining the country for the reference point of the image. Standard codes may be found in FIPS PUB 10-4. Default value, if data is not available, is spaces.	2	AA to ZZ or ♭♭		R
WAC	World Aeronautical Chart - 4 letter World Aeronautical Chart for the reference point of the image segment. World Aeronautical Chart grids the earth into regions with a 4 character ID. Default value, if data is not available, is spaces.	4	0001 to 1866 or ♭♭♭♭		R

FIELD	NAME	SIZE	VALUE RANGE	UNITS	TYPE
LAT	Latitude - at the natural reference point of the sensor. Center of the first line of imagery. The format is DDMM where DD is degrees, and MM is minutes.	4	DD = 00 to 90, MM = 00 to 59		R
LAT_HEM	Latitude Hemisphere- N = Northern Hemisphere, S = Southern Hemisphere	1	N or S		R
LONG	Longitude - at the natural reference point of the sensor. Center of the first line of imagery. The format is DDDMM where DDD is degrees, and MM is minutes.	5	DDD = 000 to 180, MM = 00 to 59		R
LONG_HEM	Longitude Hemisphere E = Eastern Hemisphere, W = Western Hemisphere.	1	E or W		R
TIME	Collection Time, referenced to GMT, and accurate to 1 minute, of the image reference point in the format HHMMZ, in which HH is the hour (00-23), and MM is the minute (00-59); the final character "Z" is Zulu and required.	5	HHMMZ		R
CREATE_DATE	Date of NITF file creation date of the image file creation in the format YYYYMMDD, in which YYYY is the year, MM is the month (01–12), and DD is the day of the month (00-31). The date changes at midnight GMT.	8	YYYYMMDD		R

2.2 USE00A (TBR) — Exploitation Usability

The Exploitation Usability extension is intended to allow a user program to determine if the image is usable for the exploitation problem currently being performed. It also contains some of the fields which would make up a NIMA standard directory entry. The format and descriptions for the user defined fields of the USE00A (TBR) are detailed in Table 2.2-1. A single USE00 (TBR) is placed in the Image Subheader, following SIEID.

Table 2.2-1. USE00A (TBR) — Exploitation Usability Extension Format
(TYPE "R" = Required, "C" = Conditional)

FIELD	NAME	SIZE	VALUE RANGE	UNITS	TYPE
CETAG	Unique Extension Identifier	6	USE00A (TBR)	n/a	R
CEL	Length Data Fields	5	00107	Bytes	R
The following fields define USE00A (TBR)					
ANGLE_TO_NORTH	Angle to True North, measured clockwise from first row of the image.	3	000 to 359	degrees	R
MEAN_GSD	Mean Ground Sample Distance. The geometric mean of the cross and along scan center-to-center distance between contiguous ground samples. Accuracy = 10%	5	000.0 to 999.9	inches	R
GROUND_COVER	Ground Cover Type 1 = no snow, 2 = snow	1	1 or 2		R
DYNAMIC_RANGE	Dynamic range of pixels in image Default value, if data is not available, is spaces.	5	00000 to 99999		R
	reserved	3	spaces		R
DAY_NIGHT	0 = day, 1 = night	1	0 or 1		R
NIIRS	NIIRS Predicted stereo NIIRS value if image is one of a stereo pair, otherwise predicted MONO NIIRS value. Accuracy = 0.1 NIIRS. Default value, if data is not available, is spaces.	3	0.0 to 9.0		R
OBL_ANG	Obliquity Angle Default value, if data is not available, is spaces.	5	00.00 to 80.00	degrees	R
ROLL_ANG	Roll Angle Default value, if data is not available, is spaces.	6	±80.00	degrees	R
	reserved	12	spaces		R
	reserved	15	spaces		R
	reserved	4	spaces		R
	reserved	1	space		R
	reserved	3	spaces		R
	reserved	1	spaces		R
	reserved	1	space		R

N_REF (TBR)	Number of Reference Lines Number of reference lines in the image. For each reference line, there will be a REFLNA extension in the NITF file.	2	00 to 99		R
N_SEG	Number of Segments	3	001 to 999		R
REV_NUM	Revolution Number The revolution number in effect at the northernmost point of orbit.	5	00001 to 99999 (TBR)		R
MAX_LP_SEG	Maximum number of lines per image, including overlap lines. The maximum number of lines per image depends upon the aggregation mode of the collector. Default value, if data is not available, is spaces.	6	000001 to 999999		R
	Reserved	6	Spaces		R
	Reserved	6	Spaces		R
SUN_EL	Sun Elevation in degrees measured from the target plane at intersection of the optical line of sight with the earth's surface at the time of the first image line. Accuracy = 0.1 degree.	5	-90.0 to +90.0	degrees	R
SUN_AZ	Sun Azimuth in degrees measured from true North clockwise (as viewed from space) at the time of the first image line. Accuracy = 0.1 degree.	5	000.0 to 360.0	degrees	R

2.3 RPC00A (TBR) — Rapid Positioning Capability

The format and descriptions for the User Defined fields of the RPC00A (TBR) extension is detailed in Table 2.3-1.

Table 2.3-1. RPC00A (TBR) - Rapid Positioning Capability Extension Format
(TYPE "R" = Required, "C" = Conditional)

FIELD	NAME	SIZE	VALUE RANGE	UNITS	TYPE
CETAG	Unique Extension Identifier	6	RPC00A (TBR)		R
CEL	Length of Data Field	5	01041		R
The following fields define RPC00A (TBR)					
SUCCESS	Reject or Success 1 = success, 0 = reject. Only if this flag is a "1" will the remainder of the data be valid. If SUCCESS field is zero the remaining fields shall be ASCII blank filled.	1	0 or 1		R
ERR_BIAS	Error- Bias. 68% non time-varying error estimate, assumes correlated images.	7	0000.00 to 6553.50	meters	R
ERR_RAND	Error - random 68% time varying estimate, assumes uncorrelated images. Expressed in meters. Accuracy = 0.1 m.	7	0000.00 to 6553.50	meters	R
LINE_OFF	Pixel Line Offset.	6	000000 to 524287		R
SAMP_OFF	Pixel Sample Offset.	5	00000 to 54144		R
LAT_OFF	Geodetic Latitude Offset. Expressed in degrees. Accuracy = .0001 deg	8	-90.0000 to +90.0000	degrees	R
LONG_OFF	Geodetic Longitude Offset. Expressed in degrees. Accuracy = .0001 deg	9	-180.0000 to +180.0000	degrees	R
HEIGHT_ OFF	Geodetic Height Offset expressed in meters.	5	-8096 to +8096	meters	R
LINE_ SCALE	Line Scale in pixels.	6	000000 to 524287		R
SAMP_ SCALE	Sample Scale in pixels.	5	00000 to 54144		R
LAT_ SCALE	Geodetic Latitude Scale in degrees. Accuracy = .0001 deg	8	-90.0000 to +90.0000	degrees	R
LONG_ SCALE	Geodetic Longitude Scale in degrees. Accuracy = .0001 deg	9	-180.0000 to +180.0000	degrees	R
HEIGHT_ SCALE	Geodetic Height Scale in meters.	5	-8096 to +8096	meters	R
LINE_NUM_COEFF_1	20 Line Numerator Coefficients	12	± 0.524287E±7		R
(through)	...	...	...		...
LINE_NUM_COEFF_20	20 Line Numerator Coefficients	12	± 0.524287E±7		R
LINE_DEN_COEFF_1	20 Line Denominator Coefficients	12	± 0.524287E±7		R
(through)	...	...	...		...
LINE DEN_COEFF_20	20 Line Denominator Coefficients	12	± 0.524287E±7		R
SAMP_NUM_COEFF_1	20 Line Numerator Coefficients	12	± 0.524287E±7		R
(through)	...	...	...		...
SAMP_NUM_COEFF_20	20 Line Numerator Coefficients	12	± 0.524287E±7		R
SAMP_DEN_COEFF_1	20 Line Denominator Coefficients	12	± 0.524287E±7		R
(through)	...	...	...		...
SAMP_DEN_COEFF_20	20 Line Denominator Coefficients	12	± 0.524287E±7		R

2.4 STREOB (TBR) — Stereo Information.

The STREO (TBR) extension provides links between several images that form a stereo set to allow exploitation of elevation information. There can be up to 3 STREO (TBR) extensions per image. The format and descriptions for the User Defined fields of the STREOB (TBR) extension is detailed in Table 2.4-1.

Table 2.4-1. STREOB (TBR)— Stereo Information Extension Format
TYPE "R" = Required, "C" = Conditional)

FIELD	NAME	SIZE	VALUE RANGE	UNITS	TYPE
CETAG	Unique Extension Identifier	6	STREOB (TBR)	n/a	R
CEL	Length of Data Field	5	00087	Bytes	R
The Following Fields Define STREOB (TBR):					
ST_ID	Stereo Mate. The 53 character image id of the first stereo mate. The first 53 characters are the first 53 characters of the STDIDC (TBR) tag.	53	Alphanumeric	n/a	R
N_MATES	Number of Stereo Mates. If there are no stereo mates, there will not be any STREOB (TBR) extensions in the file. If there is a STREOB (TBR) extension, then there will be at least 1 stereo mate.	1	1 to 3	n/a	R
MATE_INSTANCE	Mate Instance identifies which stereo mate is described in that extension. For example, this field contains a 2 for the second stereo mate.	1	1 to 3	n/a	R
B_CONV	Beginning Convergence Angle, defined at the first lines of the fore and aft images, unless those images are more than 90 degrees apart; If the images are more than 90 degrees apart, the first line of the fore and the last line of the aft shall be used. Default value, if data is not available, is spaces.	5	00.00 to 90.00	degrees	R
E_CONV	Ending Convergence Angle, defined at the last lines of the fore and aft images, unless those images are more than 90 degrees apart; If the images are more than 90 degrees apart, the last line of the fore and the first line of the aft shall be used. Default value, if data is not available, is spaces.	5	00.00 to 90.00	degrees	R

FIELD	NAME	SIZE	VALUE RANGE	UNITS	TYPE
B_ASYM	Beginning Asymmetry Angle, defined at the first lines of the fore and aft images, unless those images are more than 90 degrees apart; If the images are more than 90 degrees apart, the first line of the fore and the last line of the aft shall be used. Default value, if data is not available, is spaces.	5	00.00 to 90.00	degrees	R
E_ASYM	Ending Asymmetry Angle, defined at the last lines of the fore and aft images, unless those images are more than 90 degrees apart; If the images are more than 90 degrees apart, the last line of the fore and the first line of the aft shall be used. Default value, if data is not available, is spaces.	5	00.00 to 90.00	degrees	R
B_BIE	Beginning BIE less Convergence Angle of Stereo Mate, defined at the first lines of the fore and aft images, unless those images are more than 90 degrees apart; If the images are more than 90 degrees apart, the first line of the fore and the last line of the aft shall be used. Default value, if data is not available, is spaces.	6	± 90.00	degrees	R
E_**B**IE	Ending BIE less Convergence Angle of Stereo Mate, defined at the last lines of the fore and aft images, unless those images are more than 90 degrees apart; If the images are more than 90 degrees apart, the last line of the fore and the first line of the aft shall be used. Default value, if data is not available, is spaces.	6	± 90.00	degrees	R